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Notice of Allowability	Application No.	Applicant(s)	
	09/810,932	JONES ET AL.	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Amendment filed 15 November 2004.
2. ☒ The allowed claim(s) is/are 1-5, 26-29 and 40-44.
3. ☒ The drawings filed on 16 March 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Chad W. Miller on February 18, 2005.

3. The application has been amended as follows:

In claim 1, line 4, "an maximal length" has been changed to ---a maximal length---

In claim 1, line 17, "the rate" has been changed to ---a rate---

In claim 3, line 1, "reflection's" has been changed to ---reflection---

In claim 26, line 4, "the reflection" has been change to ---the reflection signal---

In claim 26, line 8, "the rate" has been changed to ---a rate---

In claim 27, line 1, "analyzing" has been changed to ---analyzing the correlated reflection signal---

In claim 27, line 2, "of near-end" has been changed to ---of a near-end---

In claim 28, line 2, "a data communication device" has been changed to ---the communication modem---

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In claim 40, line 2, "the location" has been changed to ---a location---.

In claim 40, line 28, "the period" has been changed to ---a period---.

In claim 40, line 30, "the system" has been changed to ---the digital subscriber line modem---.

In claim 41, "wherein the system is embodied in conjunction with a communication device" has been changed to ---wherein the digital subscriber line modem is embodied in an integrated circuit---.

Claims 14-20, 31-39, and 55-59, which were previously withdrawn, have now been cancelled.

Allowable Subject Matter

4. Claims 1-5, 26-29, and 40-44 are considered to be allowable over the cited prior art for the following reasons.

U.S. Patent No. 6,298,118 to Liggett teaches a method and communication device for testing a twisted pair communication channel using time domain reflectometry (column 4, lines 11-16) comprising a pseudo-random code processor that generates and modifies pseudo-random coded signals to be transmitted on, and received from, the twisted pair conductor channel (column 4, lines 64-67), such as an asymmetric digital subscriber line (column 3, lines 48-49) connected to a computer modem for communication on the channel (column 3, lines 33-34), wherein the signals are sent at a low energy (i.e. power) level to lower the possibility of cross-talk occurring across the various twisted line channels (column 5, lines 9-

12). Liggett also teaches that the transmitted signals (i.e. test signals) are generated using a code generator that reads from a shift register memory to define a specified maximal length sequence code, with corresponding taps, (column 5, lines 13-18 and 25-30) which is transmitted over the communication channel and reflected back, in response to the transmission, to the receiver for sending to a cross-correlator (column 5, lines 18-24), inherently with processing code, which correlates the original maximal length sequence signal with the reflected signal (column 5, lines 51-55). Liggett also teaches that a peak detector detects a plurality of peaks (i.e. signal components) of the reflected signal including peaks in response to an unwanted near-end echo pulse at the start of the signal, caused by reflection at the line interface, and a bridged tap in the communication channel (column 7, lines 30-37).

U.S. Patent No. 6,534,996 to Amrany et al. Amrany teaches a system and method for phone line characterization by time domain reflectometry comprising a method for transmitting and receiving reflection signals sent using components and processor code/software existing in a DSL modem (i.e. processor components, transmitting components, receiving components, and signal generating components that are configured to operate as part of the DSL during normal communication) connected to a communication channel (column 1, lines 51-67, column 6, lines 19-29, and Figure 5). Amrany teaches that the reflected signal is analyzed to determine the type and location of impedance disruptions (column 3, lines 20-41) of the twisted pair transmission line (column 3, lines 48-50). Amrany also teaches including an echo canceller (column 4, line 63), a finite impulse response filter (column 5, lines 4-

6), and a de-convolution means to detect phase differences and corresponding coefficients in determining the line abnormalities (column 9, lines 9-57).

U.S. Patent No. 5,600,248 to Westrom et al. teaches a fault distance locator for underground cable circuits comprising generating a pulse into a communication channel to obtain a reference pulse signal (i.e. template), during a setup operation, (column 4, lines 62-65) and, during actual operation, receiving a plurality of reflected pulses (column 8, lines 41-51) including an unwanted near-end echo pulse, caused by the reflection at the line interface, which is removed by subtracting the obtained reference/template pulse data from the actual received pulse data set (column 9, lines 9-21). Westrom then teaches determining a time interval between the beginning of the pulse injection and the subsequent peak/pulse (i.e. point of correlation) indicative of a line abnormality and then multiplying the time interval times the propagation speed to determine the distance to the location of the fault (column 9, lines 56-64). Westrom also teaches a computer controller comprising a microprocessor and a corresponding memory for storing a program, executed by the microprocessor, that initiates the generation of the input pulses, calculates the time interval to the fault (column 8, lines 14-21), and also connects to a modem to report monitoring information (column 6, lines 40-45).

While the cited prior art does teach many of the features of the claimed invention, none of the cited prior art teaches or suggests, in combination with the other claimed limitations for determining a location of a line anomaly, using a modem determine a

location of a line anomaly by using the modem to perform the steps of subtracting a template signal from a correlated signal to more clearly define a point of correlation and adding a rotated signal to a correlated reflection signal to reduce correlation artifacts wherein the rotated signal comprises a signal resulting from correlating a rotated test signal with a reflection of a rotated test signal and wherein the correlated reflection signal is a result of correlating a reflection signal of a test signal with the test signal.

The following newly discovered references are also considered pertinent to examination of the instant application:

U.S. Patent No. 6,671,311 to Raphaeli et al. teaches a receiver for use in a code shift keying spread spectrum communications system that includes a modem that correlates a received signal with a rotated template as well as transmitting the template through a twisted-pair communication line, however, the invention of Raphaeli has no teaching of any reflection or correlating a reflection of the rotated signal with the original rotated signal to form a rotated correlation signal that is added to a correlated reflection signal to reduce correlation artifacts.

U.S. Patent No. 4,535,206 to Falconer teaches echo cancellation in two-wire full-duplex data transmission with estimation of far-end data components including a receiver comprising a circular shift register but does not teach or suggest using a modem determine a location of a line anomaly by using the modem to perform the steps of adding a rotated signal to a correlated reflection signal to reduce correlation

artifacts wherein the rotated signal comprises a signal resulting from correlating a rotated test signal with a reflection of a rotated test signal and wherein the correlated reflection signal is a result of correlating a reflection signal of a test signal with the test signal.

U.S. Patent No. 6,590,889 to Preuss et al. teaches a data communications system and hybrid time-code multiplexing method including means for detecting a received signal using circular shifting but does not teach or suggest using a modem determine a location of a line anomaly by using the modem to perform the steps of adding a rotated signal to a correlated reflection signal to reduce correlation artifacts wherein the rotated signal comprises a signal resulting from correlating a rotated test signal with a reflection of a rotated test signal and wherein the correlated reflection signal is a result of correlating a reflection signal of a test signal with the test signal.

U.S. Patent No. 6,344,749 to Williams teaches a test system for measuring frequency response and dynamic range of a cable plant including a receiver for performing circular convolution to yield an impulse response of reflection but does not teach or suggest using a modem determine a location of a line anomaly by using the modem to perform the steps of adding a rotated signal to a correlated reflection signal to reduce correlation artifacts wherein the rotated signal comprises a signal resulting from correlating a rotated test signal with a reflection of a rotated test signal and wherein the correlated reflection signal is a result of correlating a reflection signal of a test signal with the test signal.

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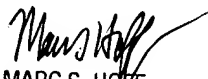
5. Any comments considered necessary by Applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (703)308-1309. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

jrw
February 21, 2005


MARC S. HOFF
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